

Appl. No. 10/662,029
Amdt Dated: September 23, 2008
Reply to Office Action of August 11, 2008

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Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1-6 (canceled)

Claim 7 (canceled)

Claim 8 (canceled)

Claim 9 (currently amended): A triangle wave generator used in a pulse width modulation current adjustment apparatus, the triangle wave generator comprising:
a first operational amplifier;
a front resistor electrically connecting a negative terminal of the first operational amplifier to ground;
a first feedback resistor, a second feedback resistor and a first current limiting resistor electrically connected to a positive terminal of the first operational amplifier so as to form a zero-crossing comparator;
a second operational amplifier, a second current limiting resistor, a capacitor, and a back grounding resistor together forming an integrator;
the back grounding resistor electrically connecting a positive terminal of the second operational amplifier to ground; and
an output of the first operational amplifier electrically connected to the positive terminal of the first operational amplifier via the first current limiting resistor and the first feedback resistor, an output of the second operational amplifier electrically connected to the negative terminal of the second operational amplifier via the capacitor and also electrically connected to the positive terminal of the first operational amplifier via the second feedback resistor, and the output of the second operational amplifier outputting a triangle wave voltage signal;
The triangle wave generator as described in claim 8, wherein the integrator comprising the back grounding resistor electrically connecting the positive terminal of the second

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operational amplifier to ground provides the triangle wave generator with the characteristic that the triangle wave voltage signal output by the second operational amplifier has a plurality of rising portions and a plurality of declining portions, with the triangle wave voltage signal consisting only of odd harmonics such that a percentage of high frequency harmonics of the triangle wave voltage signal is low.

Claim 10 (currently amended): A pulse width modulation current adjustment apparatus,
comprising:

a triangle wave generator for generating a triangle wave voltage signal;

a modulation voltage source configured for providing a modulation voltage signal;

a comparator;

a field effect transistor;

a power supply;

a first resistor; and

a second resistor;

wherein the triangle wave generator includes a first operational amplifier, a front resistor, a first feedback resistor, a second feedback resistor, a first current limiting resistor, a second operational amplifier, a second current limiting resistor, a capacitor, and a back grounding resistor;

the front resistor electrically connects a negative terminal of the first operational amplifier to ground;

the first feedback resistor, the second feedback resistor and the first current limiting resistor electrically connect to a positive terminal of the first operational amplifier so as to form a zero-crossing comparator;

the second operational amplifier, the second current limiting resistor, the capacitor and the back grounding resistor together form an integrator;

the back grounding resistor electrically connects a positive terminal of the second operational amplifier to ground;

an output terminal of the first operational amplifier electrically connects to the positive terminal of the first operational amplifier via the first current limiting resistor and the

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first feedback resistor;

an output terminal of the second operational amplifier electrically connects to a negative terminal of the second operational amplifier via the capacitor;

the output terminal of the second operational amplifier further electrically connects to the positive terminal of the first operational amplifier via the second feedback resistor;
the output terminal of the second operational amplifier is configured for outputting the triangle wave voltage signal;

the triangle wave voltage signal and the modulation signal are input to the comparator;
an output of the comparator is electrically connected to a gate terminal of the field effect transistor;
the first resistor is electrically connected between the power supply and a source terminal of the field effect transistor;
and a drain terminal of the field effect transistor outputs a pulse width modulation current signal through the second resistor to a load; and

~~The pulse width modulation current adjustment apparatus as described in claim 1,~~
 wherein the second operational amplifier, the second current limiting resistor, the capacitor and the back grounding resistor together forming an integrator and the back grounding resistor electrically connecting a positive terminal of the second operational amplifier to ground provide the triangle wave generator with the characteristic that the triangle wave voltage signal output by the output terminal of the second operational amplifier has a plurality of rising portions and a plurality of declining portions, with the triangle wave voltage signal consisting only of odd harmonics such that a percentage of high frequency harmonics of the triangle wave voltage signal is low.

Claim 11 (new): The pulse width modulation current adjustment apparatus as described in claim 10, wherein the triangle wave voltage signal is a symmetric triangle wave voltage signal.

Claim 12 (new): The pulse width modulation current adjustment apparatus as described in claim 10, wherein the field effect transistor is an N-channel enhancement-type field effect transistor.

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Claim 13 (new): The pulse width modulation current adjustment apparatus as described in claim 10, wherein the field effect transistor is a P-channel enhancement-type field effect transistor.

Claim 14 (new): The pulse width modulation current adjustment apparatus as described in claim 10, wherein the field effect transistor is an N-channel depletion-type field effect transistor.

Claim 15 (new): The pulse width modulation current adjustment apparatus as described in claim 10, wherein the field effect transistor is a P-channel depletion-type field effect transistor.

Claim 16 (new): A pulse width modulation current adjustment apparatus, comprising:
a triangle wave generator for generating a triangle wave voltage signal;
a modulation voltage source configured for providing a modulation voltage signal;
a comparator;
a field effect transistor;
a power supply;
a first resistor; and
a second resistor;
wherein the triangle wave generator includes a first operational amplifier, a front resistor, a first feedback resistor, a second feedback resistor, a first current limiting resistor, a second operational amplifier, a second current limiting resistor, a capacitor, and a back grounding resistor;
the front resistor electrically connects an inverting input terminal of the first operational amplifier to ground;
the first feedback resistor, the second feedback resistor and the first current limiting resistor electrically connect to a non-inverting input terminal of the first operational

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amplifier so as to form a zero-crossing comparator;
the second operational amplifier, the second current limiting resistor, the capacitor and the back grounding resistor together form an integrator;
the back grounding resistor electrically connects a non-inverting input terminal of the second operational amplifier to ground;
an output terminal of the first operational amplifier electrically connects to the non-inverting input terminal of the first operational amplifier via the first current limiting resistor and the first feedback resistor;
an output terminal of the second operational amplifier electrically connects to an inverting input terminal of the second operational amplifier via the capacitor;
the output terminal of the second operational amplifier further electrically connects to the non-inverting input terminal of the first operational amplifier via the second feedback resistor;
the output terminal of the second operational amplifier is configured for outputting the triangle wave voltage signal; and
the triangle wave voltage signal and the modulation signal are input to the comparator,
an output of the comparator is electrically connected to a gate terminal of the field effect transistor, the first resistor is electrically connected between the power supply and a source terminal of the field effect transistor, and a drain terminal of the field effect transistor outputs a pulse width modulation current signal through the second resistor to a load.